— Yıllık yağış miktarlarındaki düzensizliğe rağmen, yarım yüzyıldan beri bu sahada yağışın arttığı ve azaldığı belirli dönemler tesbit edilmiştir. Bu özelliği sadeleştirilmiş eğriler ortaya çıkarmıştır (Şekil: 1).

— Genel olarak yağışlar Ekim ayından itibaren artmaya başlar, en yüksek değerlere Aralık ayında ulaşılır. Buna karşılık Mayıs'ta başlayan azalma Ağustos'ta en düşük değeri bulur. Ekstrem yağışların görüldüğü yıllardaki durum da bundan pek farklı değildir (Şekil:2).

— Kış aylarındaki yağış artışı batıdan gelen depresyonların frekansını yansıtır. Başka bir anlatımla, en çok yağış depresyonların sık ve aktif olduğu ve bunlara bağlı olarak kuvvetli ve nemli rüzgârların estiği kış aylarında meydana gelir.

— İzmir ve yakın çevresinde yalnız bir yıldan bir yıla değil, fakat yılların aynı ayları arasında yağış tutarları bakımından büyük farklar vardır. Bu farklar dikkate alınarak aylık değişmelerin oranı incelenmiş ve yağışları sınıflandırma girişiminde bulunulmuştur (Çizelge: 1 ve 2).

— Aylık yağışların ortalama değerlerine göre oranları dikkate alınmak suretiyle yapılan sınıflandırmada ortalamalardan düşük yağışların yıl boyunca her ayda egemen olduğu ortaya çıkmıştır. Ortalamalardan düşük yağışların oranları yaz aylarında çok yükselmekte, buna karşılık kış aylarında nisbeten azalmaktadır. En düzenli oranlara sahip yağışlar, Aralık ayında görülmektedir.

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SUMMARY

THE FEATURES OF MONTHLY AND ANNUAL RAINFALL DISTRIBUTION IN THE IMMEDIATE SURROUNDINGS OF İZMİR

In this study we want to explain the features of the rainfall regime and to put forward the rainfall tendency in the immediate area of İzmir. In addition to comparing the mean monthly and average annual rainfall, we investigated closely the fluctuations as to the percentages of all values given for the meteorological stations (İzmir, Bornova and Menemen) and then made an attempt to classify the rainfall for the given area. The results that we obtained on the subject and variable features of the rainfall are shown as follows.

a) In the given area typical Mediterranean rainfall regime prevails. Mean annual rainfall over the area of İzmir varies widely from low totals about 337.0 mm in Menemen to a maximum of 1116.5 mm in İzmir for the observation periods. Annual rainfall does not show a similar pattern with totals and it changes largely from year to year.

b) The largest totals are usually in the winter half of the year when depressions are more active and frequent. In general maximum monthly totals occur in December. March, April, October and November are intremediate in character between the winter and summer. Monthly rainfall in the summer is the least, and shows the lowest values. Summer is the driest season of the year and this situation represents the character of the Mediterranean climate. In both July and August no rain was recorded for many years.

c) We found considerable differences in totals and percentages of humid and dry months. The fluctuations from month and year to year in considerable high content very large. Examination of monthly figures recorded for İzmir. Bornova and Menemen have shown that monthly differences exist (Table : 1 and 2).

d) We analysed and calculated the percentages of the monthly totals and compared with the averages and then classified the rainfall of the area into six groups as below :

-- Approximatley the mean monthly total rainfall (=),
-- %20-%50 less than the mean monthly (-)
— Much lower from the mean monthly (—),
— %20-%50 more than the mean monthly (+),
— Much higher from mean monthly (++),
— Doubly and most over the mean monthly (XX).

e) As a result the low totals rainfall is dominant over the immediate area of İzmir along the observation periods.

Vegetation levels of the taurus mountains of mediterranean region in turkey

İBRAHİM ATALAY

The Taurus mountains extending in the different directions of the Mediterranean region of Turkey show a few vegetation levels in terms of their physiognomic appearances and vegetation-floristic composition.

As a general rule, the vegetation levels of the Taurus mountains of Turkey are different from the other part of the Alpine orogenic belt extending southern sectiontion of Europea especially because of the climatic and geomorphical units variations and the other factors.

In this article, depending on land observations being carried out by the author during the period of 1984-1986, the vegatation levels of the Taurus Mountains and their vegetation and floristic composition will be emphansized. In this study, in order to explain the vegetation belts of the Taurus mountains, the ecological conditions of the whole area will be taken into consideration and then the vegetation formation will be evaluated, examined and finally the Taurus ranges and/or investigated area will be divided into biomes according to ecological systems.

1. GENERAL ECOLOGICAL PROPERTIES

1.1. GEOLOGIC STRUCTURE AND ITS LITHOLOGIC PROPERTIES

The Mediterranean region of Turkey comprises the Taurus Mountains which were formed by Alpine and post Alpine tectonic movements and contains nearly all of the existence of the geological times and their several lithologic units.

1.1.1. **Paleozoic formations**

Paleozoic outcrops are generally seen on the eastern and NW section of the mountains. These Paleozoic formations are made up of epimetamorphic schistes, quartzite schistes, clorite-sericite schistes, cristalized limestone, sandstone, and limestones.

1.1.2. Mesozoic formations

Mesozoic formations are widespread on the western and eastern section of the Taurus Mountains, and are characterized by the Tethys ocean in which ultrabasic and ultramafic magma injections were taken place and the carbonate sedimentations were occured. The sedimentations which were occured within the ocean continued up to the Mesozoic without interruption. That is, the Paleozoic sedimentation had continued during the Mesozoic time. Mesozoic carbonate sequences to be formed in very thick strata which are named as comprehensive series are widespread on the eastern and western sections of the Taurus mountains.

Triassic-Jurassic terrains appearing in the vicinity of Anamas Mountains-Seydişehir-Kasımlar are composed of bioclastic limestone, yellow limestone, sandy limestone, sandy and coccolithic, massive limestone, gray-black shales and limeston.

Jurrasic-Cretaceous lands occuring between Beyşehir and Akseki contain a very thick carbonate sequence and were developed under the neritic facies. In the western Taurus between Seydişehir and Akseki, the thickness of Crateceous comprehensive carbonate series is of 1000 m. Boxite deposits occur within the Senomanien strata in the vicinity of Antalya. There is, on the other hand, a thick Mesozoic carbonate deposit which had formed during the Trias and upper Cretaceous. Especially in the Western Taurus the sedimentation in the early Mesozoic and continued up to Upper Cretaceous. This formation contains following strata from the top to lower: cherty limestone, spilite, radiolarite, nodule limestone, sandstone, spilite-sandstone-marl, spilite, silex, cherty and nodully limestone.

Mesozoic formation of the Amanos Mountains is characterized with limely limestone of Trias attaining up to 1500 m, and dolomite and dolomitic limestone of Jurrasic, and yellow limestone and cherty limestone of lower Cretaceous, ophiolilic and radiolaritic limestone, marl and shales. The Mesozoic limestone of Andırın area is composed of sandy limestone and limely limestone.

Mesozoic containing ophiolite and radiolarite is found in the Alakır çayı basin (W of Antalya), between Karaman and Ermenek (Middle Taurus) and in the SE part of Lake Eğridir. These terrains are mainly composed of peridotite, serpantine, gabro, diabase, spilite, and pelagic limestone, sandstone and grauwake.

Ultrabasic and ultramafic plutons which were formed as a result of sea-floor spreading and which are composed of peridotite-gabro, dolerite, diabase and spilite, are outcropped in the vicinity of

Antalya (Kemer), in the NE of Serik, in the eastern part of Ermenek, on the Ergizek and Amanos mountains.

1.1.3. Tertiary formations :

At the end of the Mesozoic, most part of the Taurus Mountains was emerged from the sea, but some basins or depressions such as Pozantı-Çamardı and Teke Peninsula were occupied by the shallow sea and in these basins flysch formations composed of sand, limely sandstone, marl, limestone, gravel intercalation reflecting the intense erosion and sedimentation were formed.

During the Oligocene, all of the Taurus Mountains were uplifted by the Alpine tectonic movements and some local depressions were occupied by the evaporitic lakes and/or shallow seas in which evaporitic sediments containing salt, and gypsum were accumulated.

With the beginning of the Miocene the central part and SW of the Taurus Mountains was subsided and then occupied by the Miocene sea, and under this environment the marine sedimints such as marl, clay, clayey limestone, sandy limestone and other clastic sediments were formed and the thickness of the sedimentary strata is about 5000 m. In some tectonic basins, on the other hand, such as Sütçüler, Aksu-Köprüçay (W of Antalya) coarse clastic materials were accumulated due to intense erosion.

During the Neogene, especially Mio-Pliocene, some karstic and Tectonic-karstic depressions such as Gölhisar, Acıpayam, Burdur, Çamardı, Yalvaç etc. were occupied by the lakes in which white clayey limestone, clay, marl and sandostone were deposited.

During the Tertiary time, volcanic activities had also begun and in some areas such as Erenler and Alacadağ (Eastern part of Lake Beyşehir), between Ulukışla and Ecemiş, the tectonic corridor were covered by the volcanic rocks containing andesite, dacite.

1.1.4. Quaternary

The Quaternary terrains are represented by the travertines which are widespread in the Gulf of Antalya, between Antalya and Kemer, Silifke and Mersin and the young basalt lavas which were erupted along the Antakya-Maraş tectonic corridor, E of Ceyhan and alluvion built up Çukurova and other deltas.

1.2. GEOMORPHOLOGY

The Taurus Mountains arising abruptly from the Mediterranean Sea coastline show different and several topographic forms and

structural features. Today the appaerance of the mountains are responsible for the karstic processes, structural peculiarities, tectonic movements and fluvial erosion and glaciation which had taken place during the Pleistocene and early Holocene. Tectonic and tecteno-karstic depressions extending at an elevation of 800 to 1100 m are the main agricultural and settling areas of the region. The depressions or basins are Acıpayam, Elmalı, Korkuteli, Burdur-Tefenni and Isparta, and some of them were occupied by the present lakes such as Lake Burdur, Eğridir and Beyşehir.

Extensive plateau surfaces extend at an elevation of 1800-2200 m in the Middle Taurus mountains which is named Taşeli plateau. Towards the eastern section of the Tarusus, the eastern part of the Taurus mountains were dissected by the Seyhan and Ceyhan rivers. The Amanos mountains made up of ultrabasic and Paleozoic schistes rise as a horst between the Gulf of İskenderun and Antakya-Maraş tectonic graben.

Limestone terrains of the Taurus mountains had been subjected to karstification. Numerous karstic features such as doline, sink-hole, poljes or karstic plains are seen on the Taşeli plateau. «V» shaped numerous dolines which had been extensively developed on the Mesozoic hard and cracked limestone are widespread on the Dedegöl, Davraz and Bolkar mountains.

As a whole, the Taurus mountains were uplifted by the post Alpine tectonic movement that had been taken place during the Pliocene and Early Pleistocene. Uplifting of the Taurus mountains had led to rejuvenate fluvial and the intensity of the karstification. Namely, the surface drainage system of the karstic terrains were deteriorated, and the ground drainage system and caves were formed and the uplifted areas were deeply dissected by the rivers. Fluvial erosion is so intensely widespread that pre Neogene substratrum were outcropped along by the deeply incised valleys as are Ceyhan, Aksu, and Göksu river basins. As a result of these events the original surfaces of the Taurus mountains were deeply cut and the superimposed and antecedent gorges were opened more than 500 m.

During the Pleistocene and Early Holocene the upper parts of the mountains which are more than 2400 m were covered by the glacier and the glacial cirques, and the valley were opened in the karstic depressions and the elevation of the line of perpetual was estimated to be 2400 m.

The Taurus mountain ranges, except for some tectonic basins and plateaus and alluvial plains display very rugged topography, for this reason, the altitude and exposition and the slope degree of the region changes frequently in short distance and also there are deep gorges crossing the structural trending of the mountains. For example, the NE part of the Amanos mountains was cut as deep 1000 m as by the Ceyhan river. There is a great altitudial variations between depression and their surrounding areas. Although the Elmalı basin is hardly about 1000 m, the mountainous areas surrounding the basin is more than 3000 m.

1.3. CLIMATE

The most parts of the Mediterranean region are under the Mediterranean climatic influence characterized by hot and dry summers. and mild and rainy winters. But the mean annual temperature and precipitation are varied in short distance from one place to another due to the exposition and altitude and the continentality.

1.3.1. **Temperature** : The mean annual temperature is more than 18°C along the Mediterranean coast and this figure covers an altitude of 200-250 m from the sea level (İskenderun 20.2, Adana 18.9, Amamur 19.6°C) This figure decreases as low as 16°C at the height of 500 to 600 m (Maraş 16.7, Mut 17.3°C).

The mean yearly temperature is about 14°C at 1000 m height while in the inner or rear section of the Mediterranen this figure is about 12°C, the temperature decreases as low 6°C at the height of 2000 m.

1.3.1. **July temperature** : The mean July temperature ranges from 29 to 26° C between 0 and 1500 m, and 20-22° C between 1000 and 1500 m, and 18-20° C between 1500 and 2000 m. During this month the temperature of the inner or rear sections of the Mediterranean is 1 to 2° C higher than that of the Mediterranean region due to continentality.

The maximum temperature varies between 45-36°C and the highest temperature is recorded in the inner section.

1.3.3. **January temperature**: The mean January temperature is over 0° C on the south- facing slopes between sea level and 1000 m. The coastal belt of the Mediterranean is the hottest region of Turkey e.g., some year temperatures do not go below the freezing point. This figure is generally over 5° C between 0 and 500 m (Adana 9.3, Alanya

11.6, Antalya 10.1, Dörtyol 10.4, İskenderun 11.9, K. Maraş 5.1, Mut 6.3, Feke 5.0°C). January temperature of the belt extending between 500 and 1200 m ranges from 6 to 3° C; while the mean January temperature of the inner section is below the freezing point at the height of 1200 m (Elbistan -2.2, Göksu -2.5, Hadim -1.2, Konya -0.6° C).

As to the lowest temperature, minima were recorded as low as -5° C along the coastal belt of the Mediterranean while this figure is lower than 15° C (Acıpayam -17.8, Akşehir -26.7, Beyşehir -22.9, Gölhisar -20.2, İsparta -21, Elbistan and Sarız -31.5° C).

1.3.2. Precipitation

The amount of mean yearly precipitation and its distribution both in monthly, seasonal and also annually varies in a great extent regarding to the frontal activities mostly prevailing during the winter period and topographic peculiarities.

The mean annual precipitation ranges between 400 and 2600 mm. For example, on the slopes facing SW and S of the Taurus mountains receive a great amount of precipitation varying 1000-2400 mm. Namely the frontal activities coming from the Mediterranean, and taking place during the winter months are confined on the W and SW slopes of the Taurus mountains; while the deeply incised and narrow valley; the tectonic and tecteno karstic depression extending especially in the inner section of the Mediterranean region, receive less than 600 mm (Çiftehan 456, Kızılcadağ 414, Korkuteli 473, Sarıkavak (Mut) 488, Ş.karaağaç 455, Acıpayam 533, Beyşehir 477, Burdur 437, Mut 418 and Elbistan 386 mm.).

On the other hand, there are great deviations or changes both in the distribution of monthly and yearly precipitation. For example, the maximum precipitation of İsparta is about 879 mm and minimum is nearly 322 mm (Table 1).

The southern section of the Mediterranean region is under the Mediterranean precipitation regime so that the half of the yearly precipitation falls during the winter period and one-forth is in spring and the remaining in fall season,, whereas towards the inner section of the region the winter precipitation ratio decreases and in summer time it increases in a small quantity.

Snow fall occurs scarcely on the coastal belt of the Mediterranean, but in the upper parts of the Taurus mountains snow falls begin at the end of November and continue to the first week of May; and the duration of snow cover ranges between two and five months in the oro-mediterranean level or higher part of the Taurus mountains.

Table 1 : Precipitation deviation of some meteorological stations.

Name of station	Mean annual precipitation (mm)	Recorded maximum amount (mm)	the difference (mm)	%	Recorded minimum amount (mm)	the difference (mm)	%
Antalya	1173	1914	+741	+63	533	—640	—55
Anamur	1032	1415	+383	+37	540	—492	—48
Mersin	617	1035	+418	+68	278	—339	—55
Adana	646	1246	+600	+93	370	—276	—43
Antakya	1173	1550	+377	+32	651	—522	—44
Maraş	723	1133	+410	+57	309	—414	—57
İsparta	619	879	+260	+42	332	—287	—46
Burdur	437	615	+178	+41	258	—179	—41
Beyşehir	447	716	+239	+50	303	—174	—24
Pozantı	703	1172	+469	+67	304	—399	—57
Konya	335	500	+165	+49	143	—192	—57

1.3.3. Relative humidity

The mean relative humidity changes between 71 to 54 per cent. This figure is about 65 to 71 on the coastal belt of the Mediterranean. As a general rule, the relative humidity of summer months is more that that of the winter period because of the fact that dominant wind blows from the Mediterranean sea to the Taurus mountains. For this reason, in some days of July and August, this figure increases as high as 90 per cent and over, i.e., on August 7 1987, the relative humidity was recorded to be 95-99 percent in Mersin. In the higher section of the Taurus mountains, in the places where south facing slopes are covered by the fog and/or clouds due to ascending air masses bear excessive moisture. That is why, the evapotraspiration of the coastal belt of the Mediterranen sea is lower that of both inner section and same latitude. Contrary to this, the relative humidity of the inner section ranges between 50 and 45 per cent due to continentality, and does not influence the maritime air masses.

1.3.4. Winds

Dominant wind direction according to Schreiber formula is NE, NW and SW direction in January in accordance with frequently occuring frontal activities originating from the NW Europea. In that period, cold and warm air masses of the frontal activities continiously change from one to another.

During July, dominant with direction is from the SW to NE, that is, the air originating from the Mediterranean sea blows towards the Taurus mountains and this process leads to fogs and clouds covering the high parts of the Taurus Mountains especially on the slopes facing west in the Amanos Mauntains and Andırın and (Çamlıyayla) Namrun yayla localities. The dominant wind of the inner section is of NW.

1.4. SOILS

In the area of study there are severeral genetic soil types because of the fact that the region has different climatic conditions, and parent material and different landscape; especially, the exposition and the altitute varying in the short distance.(*)

*) The maps of litology, geomorphology, climate, soil can see or obtain from the publication of «Atalay, İ., 1987, General ecological properties of natural occurence areas of cedar (Cedrus libani A. Rich) forests and regioning of seed transfer in Turkey». Orman Genel Müd. (Directory of Forestry). Pub. No. 663/61, Ankara, Turkey

1.4.1. Zonal soils

These soils are common within the tectonic depression and on slightly undulating areas. The main soil groups are the reddish Mediterranean soils which have been developed on the different parent material especially on the flat karstic terrains and old alluvjal and colluvial deposits. These soils which have been developed on the slopy areas are seen along the cracks and stratification surfaces and are in clay texture, blocky and granular structure and in notral reaction (pH 5.5 -7.5). The clay accumulation is found out at the subsoil due to leaching.

Reddich-brownish soils are dominant on the upper levels of the Taurus Mountains due to the organic matter accumulation and the carbonates mostly away from the solum horizons because of the excessive precipitation.

Brown forest soils have been formed on the Paleozoic metamorphic schistes and phyllites under the densely forested areas of the Taurus mountains.

Chestnut soils are within the tectonic depressions such as Bucak, Elmalı, Korkuteli and Acıpayam under the sub-humid-semiarid climate and the tall grasses.

Reddish-yellowish podzolic soil is found out on the Amanos mountains under the humid climate and the beech and carpinus forests.

1.4.2. Azonl soils

These soils common in the flood plains, on the steep slopes, at the edge of the depressions and the lakes and they reflect the lithologic properties of the parent materials and geomorphic evolution.

Alluvial soils are found along the rivers and the deltaic plain of Göksu and Çukurova and the coastal belt of the Mediterranean Sea and some tectonic depressions. As mentioned above, the colour, texture and the chemical properties of these soils are determined by the parent material, and topograyhic forms and the ground water level. For example, hydromorphic alluvial soils are widespread near the lakes such as Beyşehir, Eğridir. Halomorphic soils are found at random along the coastal belt of the Mediterranean Sea, especially in the

places where the salty ground water is high. Reddish alluvial soils are originated from the eroded reddish Mediterranean soils.

Deep and coarse textured colluvial soils are found at the edge of the steep slopes and on the dejection cone and fans. On the other hand, reddish soils which developed on the slightly slopes of the glacis or at the vast edge of the mountains are in paleosol character and the lime is completely leached.

Regosols are only found in the vicinity of Lake Gölçük (Isparta) and the soils contain 95 per cent volcanic sand and have a thin horizon A.

Lithosols are common on the eroded surfaces of the slopes and mostly reflect parent material properties. There are debris avalances the same as dejection cones due to intense rainfall and freeze/thaw cycles.

1.4.3. Intrazonal soils

Because of the fact that the most part of the area is very rugged, slopy and the natural vegetation severely diminished and degenerated place to place leading to soil and parent material erosion. These areas are commonly covered by the thin soils reflecting physical and chemical properties of the parent material. In addition to this, continuing erosion and sedimentation prevented the development of the soil profile. For this reason, the soils reflecting geomorphic condition and the parent material are come out.

Rendzina soils which have been developing on the neogene lacustrine sediments occuring within the Acıpayam-Gölhisar depression and on the Miocene marl, and the soft clayey limestone outcropping on the Taşeli plateau and between Manavgat and Antalya, are seen.

The sandy soils are common on the Eocene flysches, the gravelly soils are found on the conglomerate extending the Köprü and Aksu river basin and the alkali and heavy textured soils are seen on the outcropped ophiolites and ultrabasic rocks. These soils having alkaline reaction are not well suitable to grow plants. Siliceous sandy soils are derived from the quartzite and quartzite schistes mostly occuring on the Amanos mountains. Organic soils are only found in the small places of the Antakya-Maraş tectonic graben. Hidromorphic and halomarphic soils are found out along the coastal belt of the Medi-

terranen sea especially in the places where between Antalya-Serik, Yumurtalık- Akyatan and Karataş (S of Cicilian plain).

High mountain-meadow soils which have rich organic content and showing acide reaction are only common on the Dümbelek düzü locality (NE of Mersin) and Alpine habitats of the mountains.

2. VEGETATION LEVELS OF THE MEDITERRANEAN REGION

From the vegetation point of wiew, there are different vegetation levels both on south facing slopes of the Taurus mountains and the inner sections. As a general rule, vegetation levels are largely depend upon the climate, altitute and exposition and continentality. Although Mediterranean region belongs to Mediterranean phytogeographic region, there are a lot of vegetation communities and forest stands belonging to the different phytogeographical region, relic and endemic species and their communities. These are due to the climatic changes which had taken place during the Pleistocene and early Holocene and isolation condition derived from the topographic peculiarities. It is generally stated that the southern section of the Mediterranean region is under the Mediterranean climate and so that whose vegetation mostly belongs to Mediterranean region, while rear or inner section of the Mediterranean region is the transistional region extending between the Mediterranean and the inner Anatolian region in terms of both climate and vegetation formations. The climate prevailing on the slopes facing Inner Anatolia or the norhern part of the Mediterranean region is under the Inner Anatolian steppe climate. For this reson, this section is covered by the dry forest and mountain steppe (Figure 1 and 2).

After having given above the general situation, we can discuss the vegetation levels and their vegetation communities describing the Mediterranean region.

2.1. EU - MEDITERRANEAN VEGETATION LEVEL

This belt comprises on the southern slopes of the Taurus mountain rising up to 1100-1200 m and backward section which named as Antakya-Maraş tectonic graben, the lower and middle basin of the Göksu river and tectonic depressions of the western Taurus mountains which is under the influence of Mediterranean sea. These areas

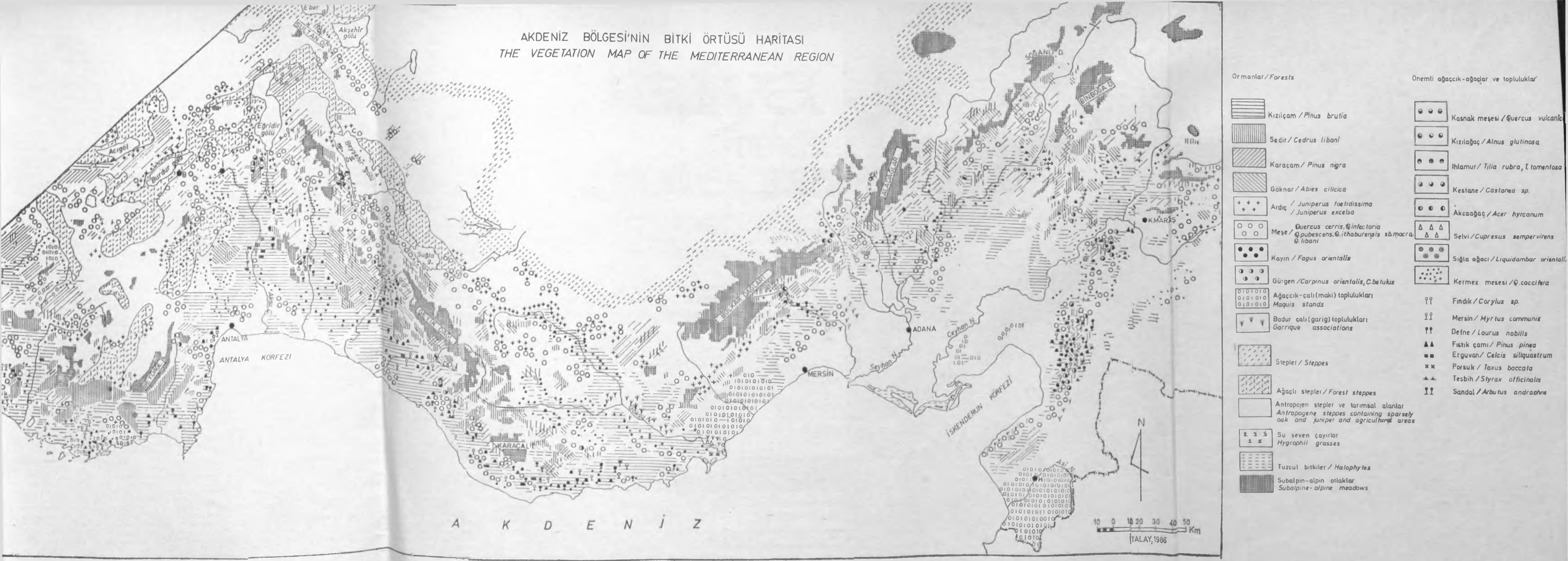

Figure 1: Vegetation map of the Mediterranean region.

are under the Mediterranean climate being characterized by hot dry summers and mild and rainy winters. As a matter of fact, the mean January temperature is not lower than 5°C, but there is great variation in the amount of yearly precipitation. The southern slopes of the Taurus mountains, except for Cicilian or Çukurova and the area extending between Silifke and Mersin, receive the precipitation totalling generally more than 1000 mm, while in the inner section the figure is less than 600 mm and the driest part of the region is the area of Mut basin.

Depending upon the climate, dominant vegetation is trees and shrubs with xerophytic either with needle- like leaves or with evergreen leaves of sclerophyll character. The vegetation of this belt can be divided into two types:

1— Forests of red pine, and 2— shrub vegetation.

2.1.1. Forests of Pinus brutia

As it is known red pine (**Pinus brutia**), which is adopted to the climate in which there is long dry season is found on the southern Italy, Cyprus, west of Syria, some patches of Crimea, west of Caucacia, north of Iraq and Iran and Afghan on the coastal belt of middle and western Black Sea Region, and along the lower watershed of the Kızılırmak and Sakarya, Yeşilırmak, Gökırmak, and Simav, and in the vicinity of Eruh (Vilayet Siirt, SE Anatolia) in Turkey.

Pinus brutia forests are in different form and stands according to the ecological condition. As a general rule, the degraded forests are found on the ultrabasic and ultramafic plutons extending between Marmaris and Muğla and the locality of Ayvalı, Hassa etc. and in the places where natural environment have been deteriorated and in the dry habitats. Some **Pinus brutia** cluster and trees are also observed within the maquis vegetation; while in the places where the annual precipitation is more than 1000 mm the **Pinus brutia** forests are in good stands. For example, there are **Pinus brutia** forests which are in good stands with tall and smooth form in the vicinity of Düzlerçamı (N of Antalya), Kaş, Pos and between Alanya and Gazipaşa. It can be stated that **Pinus brutia** is mostly fast growing tree in places where ground water level is high and summer drought is not long.

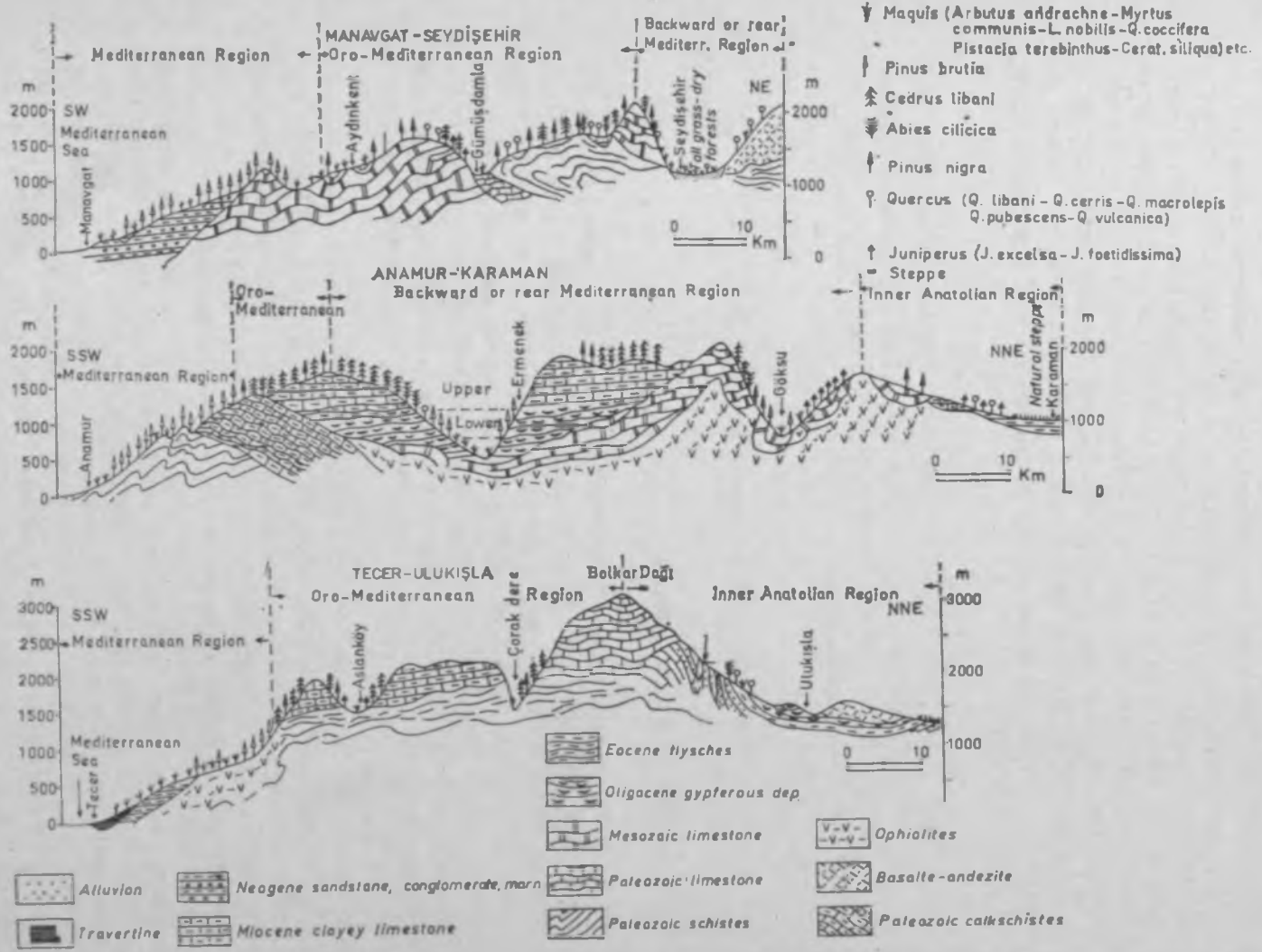

Figure 2: Vegetation profiles, levels and geological cross-sections of the Taurus mountains.

There are maquis elements within the **Pinus brutia** forests climbing up to 1500 m, these elements are **Styrax officinalis, Phillyrea media, P. latifolia, Mrytus comminus, Olea europea, Quercus coccifera, Arbutus andrachne, A. unedo, Ceratonia ciliqua, Pistacia terebinthus,** and also found some shrubs having the short from such as **Calycotome villosa, Cistus creticus, C. verticillata, C. salviifolius, Micromeria mrytifolia, Erica manipuliflora** etc. As example of these, **Phillyrea latifolia, Mrytus comminus, Olea europea, Quercus coccifera, Calycotome villosa, Cistus creticus, C. salviifolius, Arbutus andrachne, Micromeria mrytifolia.** These shrubs are associated with the **Pinus brutia** forests, as in the north of Mersin. Some composition is found out between Adana and Karsantı area, NE part of the Taurus Mountains.

Towards the upward section of the belt of **Pinus brutia** forests, some **Quercus** and **Juniperus** species are also found as shrub species. For example, **Strax officinalis, Quercus infectoria, Juniperus oxycedrus, Q. cerris, Coronilla emerus, Brachypodium sylavticum, Cephalanthera rubra** was found out in the vicinity of Karsantı (Pos) district between 800 and 1200 m. (Yurdakulol 1977).

Generally, in the humid or wet habitat of the **Pinus brutia** forests following shrub species are dominant: **Styrax officinalis, Arbutus andrachne, Cercis siliquastrum, Mytrus comminus, Quercus infectoria, Q. libani, Nerium oleander, Ceratonia siliqua, Vitex agnus-castus.** These floristic composition are clearly seen in the vicinity of Karasantı and Pozantı, in the southern part of lake Eğridir and around the lake Kovada, and in the western part of the Amanos mountains. On the other hand, in the dry part of the belt following species are widespread: **Quercus coccifera, Paliurus spina-christii, Berberis creticus, Cistus villosus, C. salviifolius, Olea europea.**

In the upper part of the lower Mediterranean belt, **Pinus brutia** is associated with **Cedrus libani, Abies cilicica, Pinus nigra, Juniperus excelsa, J. comminus** and **J. foetidissima. Pinus brutia** and **Cedrus libani** mixed forests are clearly seen on the south-facing of the Babadağ in Fethiye district (W. of Taurus).

2.2. SHRUB FORMATIONS OR VEGETATIONS

As a results of the destruction of **Pinus brutia** forests, maquis and/or shrub vegetation have been come out as if they were climax vegetation. In other words because of the fact that natural equilibrium was largely deteriorated by the forest fire and opening of the field and heavy grazing system have produced a new generation. So the medi-

terranean maquis is not generally considered as a climax for it does not represent a type of vegetation in equilibrium with the climate and the soil or, in broad sense, the natural condition (Figure 1,2).

Pinus brutia being a climax tree do not generate in the area which was occupied by the broad-leaved shrub species. Because **Pinus brutia** is need to direct radiation to maintain the generation. Namely, the seeds of the **Pinus brutia** do not generate under the communities of **Arbutus** species and **Mrytus comminus** due to the fact that the direct radiation does not penetrate into them. For this reason, in the dry and/or degraded areas maquis and garrique vegetation grow as a climax vegetation. But If cultivation or grazing is stopped then its succession tending towards the true zonal vegetation will take over. According to the studies which were carried out in the fired areas, the woodlands containing **Pinus brutia** can regenerate only after forest fires,: and this explains why the trees are all of much the same age. The progressive successions of the fired areas are as follows: **Coridothymus capitatus, Cistus creticus, Arbitus andrachne, Phillyrea latifolia** and **Pinus brutia** (Seçmen 1978).

On the other hand, the short tall shrub vegetation named garrique whose tall changes between 0.5 and 1.0 m are composed of **Cistus creticus, C. salviifolius, Lavandula stoechas, Poterium spinosum, Thmbra spicata ,Sarcopoterium spinosum, Fotanesia phillyreoides, Spartium junceum, Asparagus acutifolius, Calicotome spinosa, Genista acathoelados, Lavandula cariensis, Nosmanirus officinalis.** These species are all that finally remains in places seriously degraded by continuous fire and grazing as is in the Mut basin and on the shore belt of Mediterranean Sea extending between Silifke and Erdemli and in the vicinity of Anamur and Gazipaşa. Especially species of **Sarcopoterium spinosum** put in an appearance on the bare spots. Garrigue vegetatoin is a sea of flowers in spring, but it presents a severely scorched aspect in late summer (Uslu, 1977).

Most of the maquis members and/or sclerophyllous species, usually shrub like in form may develop into big trees in suitable habitats, in other words, in the protected area shrub vegetation readily starts to evolve again in the direction of the forest climax. For example, **Styrax officinalis** attain to 30-35 cm in diatemer and 9 m in height is observed at the Samandağ locality in Antakya (E. of Med.) (Oflas 1976), and **Arbutus andrachne** and **Quercus coccifera** grow as a natural tree in the protected area in the Mediterranean region.

The maquis vegetation commonly forming shrub formations is clearly seen on the coastal belt of the Mediterranean especially between Kaş **Quercus coccifera** communities which are being grazed all over the Mut basin and on the İbradı plateau (Fig. 1).

Leading communities of maquis are as follows:

1— **Quercus coccifera community:**

This community commerce at the shore belt and clibs up to as high as 1500 and 1600 m and this oak spreads towards the inner or rear section of the Mediterranean region, i.e. as far as Burdur and İsparta on the north, and Maraş on the NE and also this oak can be considered as a indicator species of the Mediterranean climate.

Quercus coccifera communities which are being grazed all over the year, are the natural meadow, grassland for the domestic animal, these comminities rising up to 800 m are commonly associated with **Arbutus andrachne, A. unedo, Pinus brutia, Juniperus excelsa, J. oxycedrus, Olea europea, Laurus nobilis**, etc.

Quercus coccifera is also found as shrub layer of **Cedrus libani** and **Pinus nigra** forests.

2— **Olea europea community**

This shrub which is named wild olea and growing on the sub humid and semiarid and the warm and temperate variant of the Mediterranean climate is widespread along the seashore of the Mediterranean and rises up to 700 and sometimes 1000 m. This community contains **Phillyrea latifolia, Pistacia, lentiscus, Daphane sericea, Paliurus spina-christii, Quercus coccifera, Laurus nobilis, Calicotome villosa, Rhamnus oleoides, Cistus creticus and Arbutus andrachne.**

3— **Arbutus andrachne community :**

This community growing generally in the wet habitat or under the humid climate and rising up to 1000 and 1200 m on the Taurus mountains includes shrubs and trees such as **Quercus coccifera, Phillyrea Phillyrea latifolia, Cistus creticus, Daphane sericea, Pistacia palestiana, Styrax officinalis, Cratagus monogyna, Laurus nobilis, Juniperus oxycedrus, Ostrya carpinifolia, Quercus infectoria,.** This community is commonly centered on the slopes facing east in the Amanos mountains, Köprü valley (NE of Antalya), along the coastal belt extending between Demre and Kaş, on the NW slopes of the Geyik mountains, where annual precipitation receives more than 800 and 1000 mm. In some places this community forms the shrub layer of the **Pinus brutia** forests.

4- **Laurus nobilis-Ceratonia siliqua community**

This community rising up to 800 m on the Taurus mountain and growing commonly mild, semiarid, subhumid and humid part of the Mediterranea region is widespread on the slopes facing Mediterranean sea of Taurus Mountains. Leading species which are accompanied this community are **Philyrea latifolia, Quercus coccifera, Pistacia palestiana, Daphane sericea, Rhamnus oleoides, Calicotome villosa. Olea europea, Cistus creticus, Juniperus oxycedrus, Styrax officinalis Quercus infectoria,** The fruits of **Ceratonia siliqua** are largely used or eaten by the peasants and the leaves of the **Laurus nobilis** are utulized in recent years for pharmacy.

2.3. PHYRGANA OR GARRIQUE VEGETATION

Phrygana and/or garrique whose height rarely exceeds 50 cm spread is replaced by maquis where maquis vegetation is largely destroyed or with the degeneration of the maquis, then vegatation called Phrygana comes into being. Leading species of the phrygana are composed of **Sarcopoterium spinosum, Coridothymus capitatus, Fumana arabica, F. thymifolia, Cistus salviifolius, C. parviflorus, Euphorbia hierosolymitana, E. acanthotohammos, Teucrium divaricatum, T. creticum, Salvia triloba, Micromeria nervosa, Majorana syriaca, Geneista acanthocloda, Phlomis viscosa, P. cretica, Calicotome villosa, Erica verticillata, Thymbra spicata, Satureja thymbra.**

2.4. THE VEGETATION OF THE MOUNTAIN MEDITERRANEAN

The belt extends on the slopes facing south of the Taurus Mountains extending between 1200 and 2000 m. and in the rear or backward section of the Taurus mountains the sections extending between 1000 and 2000/2200 m, and the belt is largely covered by forests of **Pinus nigra, Cedurs libani** and **Abies cilicica,** rearly **Quercus** and **Juniperus** species. That is, in the mountain regions of the Mediterranean with increasing altitude not only does the temperature decrease but the dry season also disappears of becomes shorter. So the evergreen sclerophyllous and **Pinus brutia** forests, and shrub forests are succeded by a sub Mediterranean deciduous forest with Oak and Carpinus and Alnus, and pine forests containing cedar, fir and black pine.

On the other hand, the temperature, precipitation and relative humudity also decrease from the Mediterranean toward the inner section due to continentality and the other factors.

In the following articles the ecological proparties and floristic composition the forests would be summarized.

2.4.1. Forest of Pinus nigra

In Turkey, **Pinus nigra** var. **pallasiana** appears on the southern slopes of the Northern Anatolia between 400 and 1400 m, this forest covers on the slopes facing north between 800 and 1200 m in the Aegean Region and the forests continue toward the mountainous areas of the Inner Anatolia. **Pinus nigra** grows in the different habitats and in extensive areas changing from semiarid, sub humid to humid and from cool and to cold climate, but thrive on the deep soil, debris deposits and schistes and the flysches. Good **Pinus nigra** stands appears on the Çaldağı (in the vicinity of Bucak), in the vicinity of Andırın and on the Geyik Mountains and the upper basin of the Seyhan and Ceyhan rivers. The best groving area of the trees are evolved in the S of Egridir and SW of Lake Beyşehir (Islibucak locality) and Söğüt Yayla (N of Alanya) and Karsantı basin.

Mixed **Pinus nigra** forests are mainly composed of **Cedrus libani, Abies cilicica,** and rarely **Ostrya carpinifolia, Carpinus orientalis, Acer campestre** and **Quercus** sp. in the wet habitat. The shrub layer of the forests is of **Quercus cerris, Q. coccifera Fraxinus ornus** and **Juniperus oxycedrus** (Yurdakulol 1978).

In the Amanos mountains, forests of **Pinus nigra,** extending between 1100-1600 m. on the northern slopes, commen and the following species are found in the forests: **Quercus pseudocerris, Juniperus oxycedrus, Populus tremula, Sorbus torminalis, Fraxinus ornus, Acer monpessulanum, Abies cilicica, Fagus orientalis, Styrax officinalis,** (Akman 1973).

2.4.2. Forests of Abies cilicica

The mixed **Abies clicica** forests are only observed between on the Amanos Mountain in the east and Bucak (Burdur province) in the west in the Taurus Mountain chains. The trees continue as far as Ulukışla and towards the northern sections of Tahtalı and Binboğa Mountain in the direction of N, and also appear between 1200 and 1800 m. This fir is generally found in the pure stands on the slopes facing north, and the other areas **Abies cilicica** is seen as mixed forests composed of **Pinus nigra** and **Cedrus libani** forests. Pure stands occuring on the southern slopes are due to destruction of the **Pinus nigra** and **Cedrus libani.** In other words, the trees are not used as are the **Cedrus** and **Pinus nigra** trees. That is why, pure **Abies cilicica** clusters are in pure stands in the vicinity of settlement areas. But, the branches of the trees are being chopped off in order to obtain food for animals.

These pure stands are found out in the northern section of Mut-Ermenek basin, near Yenişarbademli (W of lake Beyşehir) and on the northern slopes of the Geyik and Bolkar mountains.

In the **Abies cilicica** forests which are found in the northern section of Çukurova (Cicilian) basin the following species are most often encountered: **Cedrus libani, Acer hyrcanum, Sorbus torminalis, Quercus cerris, Ostrya carpinifolia,** and the shrub vegetation of these forests is associated with **Juniperus oxycedrus, Cotoneaster nummularia, Rubus canescens** var. **glabratus** (Yurdakuol 1977). The remaining fir forests are composed of **Pinus nigra** and **Cedrus libani.**

2.4.3. Forests of Cedrus libani

Cedar **(Cedrus libani)** forests grow on the north African mountains including the Taurus Mountains in Turkey, and the mountains Syria and Lebanon. They are also found on the crests of Trodos mountains in Cyprus (Quezel 1972).

In the Taurus mountains, **Cedrus libani** is a prominent tree of the both orobiome or the upper belt of the Taurus mountains and the sub continental areas of the Inner Anatolia. In the Taurus mountains **Cedrus libani** begins to appear at the altitute of 800 to 1100 m and continue up to 1800 and 2000 m on the slopes facing south or Mediterranean sea, while this tree commences at an elevation of 1400 to 1550 m and rises up to 2000 to 2200 m on the northern slopes of the mountains in the backward and/or rear region of the Mediterranean Region due to continentality.

In the Amanos Mountains this altitudinal level extends between 500 (550) and 1800-2000 m. Cedar groves are found everwhere in the Taurus Mountains, and they commence at the lower section of the Babadağ Mountain and Anamur section and continue toward the northern end of the Tahtalı Mountain and the northern slopes of the Sultan Mountain (SW of Inner Anatolia).

In the Taurus Mountains cedar **(Cedrus libani)** produce either pure stands or mixed stands associating with **Pinus nigra, Fagus orientalis, Fraxinus** sp. **Acer** sp., **Tilia** sp., **Quercus** sp., **Juniperus** sp., and **Pinus brutia.** The shrub layer of cedar forests is mainly composed of **Stryax officinalis, Arbutus andrachne, Paliurus spina-christi, Quercus coccifera.**

Cedar forests which are common in the inner section and the upper section of the Amanos mountain contain **Quercus pseudocerris, Abies cilicica, Pinus nigra, Sorbus torminalis, Cotoneaster nummularia,** var.

microphyllum, Juniperus drupecea, Ostrya carpinifolia, Styrax officinalis, Sorbus graeca, Fagus orientalis, Fraxinus ornus, Carpinus orientalis.

Pure and mixed cedar forests also appear in the northern section of Amanos mountain and near the district of Andırın. Mixed cedar forests contain **Acer** sp., **Pinus nigra, Abies cilicica** and the shrub layer of these forests is composed of **Quercus coccifera, Paliurus spina christi, Styrax officinalis** and **Juniperus oxycedrus.** Moreover, juniper degraded cluster is seen to be covered sparsely in the upper part of the natural timberline; so that these areas had been destroyed (Fig. 1).

The conifer tree species which are mostly found within the cedar forests are **Pinus nigra, Pinus brutia** and **Abies cilicica** in the Karsantı (Pos) and Pozantı district. At the Asmacık locality (NW of Pozantı) reflecting wet habitat following species are found in the cedar forest: **Ostrya carpinifolia, Fraxinus angustifolia, Quercus infectoria, Acer hrycanum, Juniperus foetidissima.**

Leading species which are found out within the cedar forests on the Davras and Dedegöl mountains are **Quercus vulcanica, Quercus cerris, Q. libani, Pinus nigra, Abies cilicica, Juniperus oxycedrus, J. foetidissima, J. excelsa, Fraxinus ornus, Acer platanoides, A. hyrcanum, Sorbus torminalis, Populus tremula, Salix alba, Ostrya carpinifolia, Ulmus glabra, Celtis orientalis, Cornus mas, Pistacia terebinthus, Tilia rubra, Quercus pubescens.** And the herbaceous vegetation most of which belong to Euro-Siberian flora region.

In the Teke peninsula (W of Antalya Gulf), the cedar forests are mostlly in pure stands. In this area leding species associating with cedar forests are **Pinus nigra, Quercus** sp., and **Acer hyrcanum**. In Alakır stream basins cedar forests covering the mountainous areas are in virgin forests.

Cedar forests have been growing in the different parent material varying ultrabazic and basic volcanic rocks metamorphic schistes, quartzite, quartzite schistes and sedimentary rocks, and climate changing from humid, to subhumid climates, but their optimum groving areas found out to have been in the transistional zone located in between Mediterranean and continental inner Anatolian steppic climate (Atalay, 1987).(*)

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* The ecological condition of the cedar and its regioning in terms of seecd transfer was completed by Atalay. More information can be obtain Atalay, I., 1987. General Ecological condition...

2.4.4. Forests of Juniperus

In the Taurus mountains, in general, Juniper forests are dominated by **J. excelsa, J. oxycedrus, J. comminus** which are extensively found in the maquis formations and also form the shrub layers of the forests. It can be stated that the juniper communities have been developed as a secondary succession and/or community in the places where the forests were destroyed. Indeed, the degraded juniper community is commun near the rural settlements which are situated in the mountainous areas or orobiome of the Taurus mountains such as near Aslanköy, Andırın, Güzeloluk, Mut, Sütçüler, around the Lake Beyşehir and Eğridir.

The degraded juniper forests and clusters are also seen in the inner sections where the natural vegetation diminished and these comunities climb up to the upper timberline.

2.4.5. Forests of Quercus (Q. libani, Q. cerris, Q-infectoria).

The mixed forests containing oaks and junipers are rarely widespread between 800 and 1200 m in the transistional zone Mediterranean region and the oromediterranean belt. The coppice of **Quercus libani, Q. cerris, Q. infectoria, Q. frainetto** is frequently found around the Lake Beyşehir in the vicinity of Cevizli (N of Alanya). **Quercus pubescens, Q. cerris** and **Q. macrolepis** subsp. **ithaburensis** are dominant in the inner section or rear section of the Mediterranean region due to the continentality.

The most common oak species and coppices are widespread on the Amanos mountains. **Q. pseudocerris** which is a characteristic oak species for Mediterranean is seen among Erzin-Dörtyol-Payas district and is found between 550-1800 m. This forest contains **Pinus nigra, Pinus brutia, Sorbus torminalis, Carpinus orientalis, Fagus orientalis, Cercis siliquastrum, Crategus monogyana, Pistacia terebinthus, Cotinus coccygina, Juniperus oxycedrus** (Akman 1873).

Quercus vulcanica which is an endemic oak species is found out on the Davras and Dedegöl (Anamas) Mountains. This oak grows within the karstic depression such as dolines, sink holes, deep karstic valleys having deep and wet soils. These karstic holes protect the oaks from the cold winds blowing from the northern sectors. The karstic holes, on the other hand, also contain some hydrophytic herbs and shrubs. Indeed as before mentioned, **Sorbus torminalis, Tilia rubra, Fraxinus ornus, Ulmus glabra, Ostrya carpinifolia** considering as a relict tree and shrub found in the karstic depressions. It can be accepted that **Q. libani** and **Q. infectoria** are indicator species of the wet habitats.

2.4.6. Forests of Fagus orientalis

The forests are only widespread along the slopes facing west of Amanos mountains, between 1100 and 1500 m and rise up to 1900 m on the SW slopes of the Musa Mountain, and grow under the humid habibtats of the Amanos mountains. Growing areas of the **Fagus orientalis** are under the foggy conditions which are formed during the summer seasons since the air masses are rich in moisture ascending along the western slopes of the mountains (Fig. 1).

These forests are associated with **Sorbus torminalis, Quercus pseudocerris, Abies cilicica, Ostrya carpinifolia, Carpinus orientalis, Acer platanoides, Euonymus latifolia, Cedrus libani, Corylus avellana, Staphylea pinnata** and their undergroundflora are often composed of hygrophytic herbs.

Some groves of the **Fagus orientalis** are seen between Andırın and Gebenköy (N of Amanos Mountains) and on the northern slopes of Karsantı basin.

2.4.7. Forest of Carpinus orientalis

This forest extending between Osmaniye and Papas is mixed with **Fagus orientalis, Cedrus libani** and **Abies cilicica.** This forest which is found on the north facing slopes is often composed of **Fraxinus ornus, Quercus pseudocerris, Q. infectoria, Daphanea sericea, Cornus mas, Ilex colchica, Buxus longifolia, Taxus baccata, Ulmus glabra. Juniperus drupecea. Eriolobus trilobutus, Sorbus torminalis, Quercus calliprinos, Cercis siliquastrum,** and **Pinus brutia** (Akman 1973).

Such floristic composition reflects the humid and perhumid climate which had been prevailed during the Quaternary period, in the Amanos Mountains.

2.5. HERBACEOUS FORMATIONS

These formations could be divided into three vegetations in terms of appaerance and ecological conditions. Subalpine vegetation is found above natural timberline on the higher part of the Taurus Mountains and tallgrasses the same as prairie is widespread within the tectonic and tecteno-karstic depressions which are located on the W and NW section of the Taurus ranges. Antropogene steppe vegetation is common where natural vegetation was completely destroyed and/or diminisned.

2.5.1. Subalpine herbaceous vegatation

Subalpine herbaceous vegetation resembling the Inner Anatolian steppe vegetation in terms of floristic composition commences on the east-facing slopes of Taurus Mountains at an altitude of 2000 m and at height of 2200 m in the inner section. The climax vegetation of the higher parts of the Taurus has been considerably degenerated because of the overgrazing. As a result of this event most of the climax species were replaced by the spiny cushion and the bitter species.

The species collected on the Çal Mountain (W of Taurus mountain) at an elevation of 2000 and 2200 m are as follows: **Ajuga iva, Alyssum** sp.,**Morina persica, Astragalus** sp., **Dianthus** sp., **Onosis** sp., **Marrubium parviflorum, Pilosella hoppeana, Ebenus laguroides, Thymus longicalius, Hypercium arincullariifolium, Campanula lyrata, Potentilla thuriniaca, Sedum** sp., **Cirsium**, sp., **Centeurea** sp., **Ornithagalum narbonense, Chamaecytiscus pymaeus, Onosis sessiliflora, Berberis crataegina.**

Leading species which are found on the Dümbelekdüzü (Middle Taurus) extending between 2000 and 2200 m are: **Phlomis armeniaca, Marrubium bourgaei, Euphorbia kotschyana, Daphane oleoides, Astragalus microcephalus, Onobrychis cornuta, Verbascum sp., Cirsium** sp.

Aydos mountain which is located N of Bolkar Mountain has a typic subalpine flora representing with **Onobrychis cornuta, Astragalus linoatus, A. amoenus, A. eriophyllus, A. condensatus, Draba acaulus, Tanacatum armenum, Thymus cherleriodies, Acantholimon andrasacenum, A. venustum, A. libanoticum** (Erik 1982).

Subalpine herbaceous species dominating more than 2300-2400 m in the Bolkar and the Aladağ Mountains are of **Festuca** and **Astragalus**. In the Aladağ mountains subalpine vegetation which begins about an elevation of 2700 m and thorny and spiny cushion as **Acantolimon** and**Astragalus** are seen as a dominant appaerance in such habitats. **Astragalus gummunifer**, for example, community is also settled at an altitute of 1650-2000 m in the Antitaurus Mountin (N of Adana). This community is also in an dominant appaerance where the forests of **Pinus nigra** were completely destroyed such as in the north of Adana and around Akseki (NW Taurus). In addition, **Astragalus angustifolius** community occuring in the Aegaen region, Inner Anatolia (Hasan Mountain) and in the northern section of Anatolia (Beypazarı, Ayaş district and Işık Mountain) is also found on the Antitaurus Mountains.

Asphodeline taurica-Euphorbia kotschyana comminity was come into being as a result of the destruction cedar and black pine. In such somewhat wet areas **Barbarea minor** ver. **Eripoda community** is found at an elevation of 2000-2100, and **Festuca varia-Bromus erectus** var. **Tricolor** community, occuring between 2150-2350 m was also come across (Yurdakulol 1977).

As a general rule, the herbaceous plants commencing over the natural timberline are similar to that of the Inner Anatolian steppe vegetation in terms of floristic composition. Indeed the most part of the steppe vegetation belonging to Irano-Turanian floristic region is found in such areas where the Mediterranean elements are second in order. Euro-Siberian hebaceous plants, on the other hand, had settled during the pluvial or glacial periods also appear, in that region.

For example, according to the floristic regions or from the viewpoint the vegetation of the Aydos M. is given in percentage in the following: Euro-Siberian 3.3., Mediterranean 8.7, Irano-Turanian 18.8, and the ratio of endemic plant is about 21.8 percent.

The steppe vegetation such as the species of **Artemisia, Astragalus, Acantholimon, Stipa, Bromus, Salvia, Thymus, Genista, Allium, Teucrium, Artemisia** mostly belonging to Irano-Toranian region are encountered as a dominant case in Inner Anatolian plateaous and plains extending between 1100 and 1200 m. and most of them grow in spring and in early summer due to the pronouncing summer drought and cold winter reflecting the continental influences. Tall steppe and/or forest-steppe vegetation occuring within the tectonic, tecteno-karstic depression and/or plain lying NW part of the Taurus Mountain and locating in the rear section of the Mediterranean such as Elmalı-Korkuteli, Bozova, Acıpayam, Tefenni grow under the semiarid Mediterranean and sub-Mediterranean climate.

2.5.2. Antropogene steppe

Most part of the inner section of the Mediterranean Region and the orobiome of Inner Anatolia were occupied by antropogene steppe vegetation and/or herbaceous plants. This vegetation was revealed where dry forests were severely destroyed, and it resembles to the Inner Anatolian steppe vegetation. Antropogene steppe vegetation is composed of the species containing **Astragalus, Euphorbia, Thymus, Salvia, Acantholomon**, etc.

CONCLUSION and DISCUSSION

Like European forests, Mediterranean forests have a tendency to be divided into succesive altitudinal levels or zones. These altitudinal levels of the Mediterranean vegetation were divided into several levels by QUEZEL (1977), OZENDA (1970), GAUSEEN (1954), TOMASELLI (1970), and BIROT and DRESH (1964) as shown table 2 and Fig. 3.

From the phytosociological and vegetation apperance and its compositional point of view, the vegetation of the Taurus mountains differ from that of the other countries or mountains of the Mediterranean region due to amount of precipitation, geomorphic peculiarities and geographic location and other factors. Maquis, for example, is a seconder formation or vegetation and the drought of the Turkish Mediterranean Region is much less than that of the other Mediterranean countries. That is why, from the vegetation formations and their ecological conditions point of view, we can consider the follo wing vegetation belts (Fig. 4 and 2).

1— Lower or thermo Mediterranean vegatation belt generally composed of **Pinus brutia** and maquis vegetation. The belt can be divided into two subbelts. 1— Mainly maquis vegetation which is widespread within the lower levels and 2— forests of **Pinus brutia** cover an altitute of as high as 1000-1500 m. According to field observations, the maquis vegetation and its community is coming into being due to the fact that **Pinus brutia** forests were severely destroyed and degenerated and/or diminished.

2— Mountain Mediterranean forests, sometimes also called Oro and Upper mediterranean forests in which Mediterranean conifers play an important part black pine (**Pinus nigra** var. **pallasiana**), cedar (**Cedrus libani**) and Taurus fir (**Abies cilicica**) and there is a deciduous forests in secondary importance which are not observed everwhere on the Taurus Mountains. But these forests are widespead on the rear section of the Mediterranean (e.i. Maraş province and its surroundings, Lake Eğridir and Beyşehir, on the Amanos mountain and Geyik Mountain, in the vicinity of Cevizli) and are composed of **Quercus cerris, Q. infectoria, Q. libani** and **Q. coccifera.**

As to the vegetation belt of the rear or transitstional region which extends between the Mediterranean and Inner and/or continental region of Anatolia it differs from that of the Mediterranean region or Taurus Mountains on the slopes facing Mediterranean sea. The vegetation belts of this region can be divided into three main levels:

Table 2. Pirincipal classifications of Mediterranean forests (Quezel, 1977).

QUEZEL	OZENDA	GAUSSEN	TOMASELLI	BIROT and DRESCH
Oro-Mediterranean	Alti-Mediterranean Oro-Mediterranean			
Mediterranean mountain	Sub-Mediterranean?	Mountainous	Mountainous	Supra-Mediterranean Mixed sub-Mediterranean
Upper Mediterranean	Sub-Mediterranean	Hilly	Sub-Mediterranean	Mixed Mediterranean
Eu-Mediterranean	Upper Mediterranean	Mediterranean	Sublittoral Mediterranean	Mediterranean
Lower Mediterranean	Lower Mediterranean	Thermo-Mediterranean	Littoral Mediterranean	

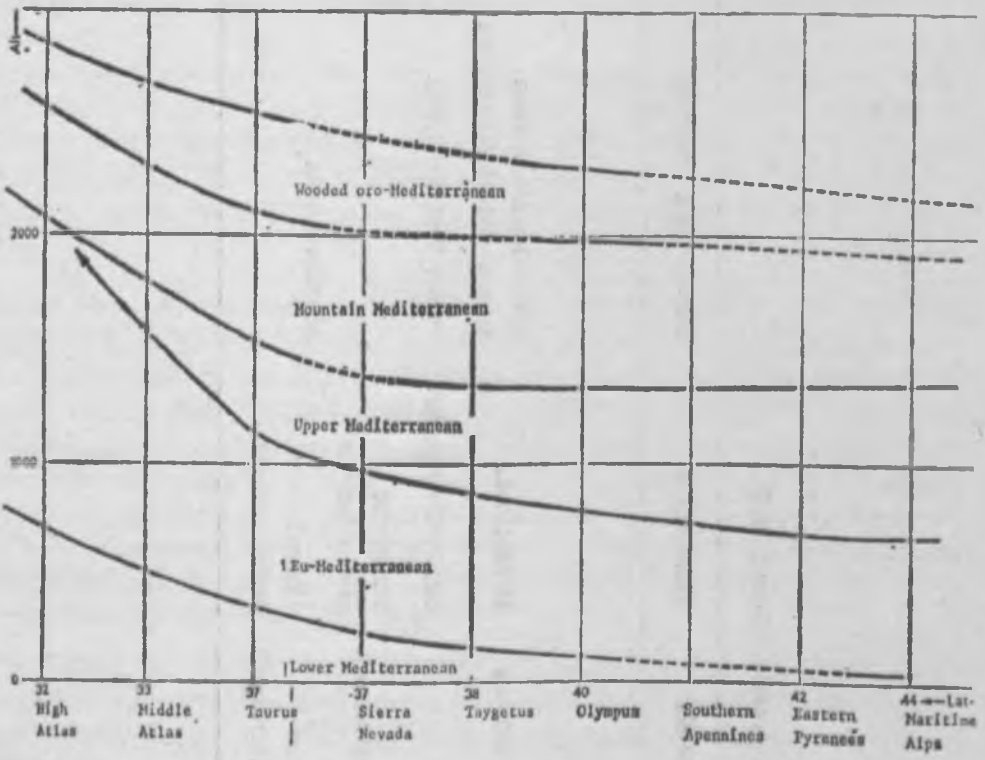

Figure 3: Schematic representation of altitudinal levels as a fonction of latitude of the mediterranean region (Quezel, 1977).

1— **Pinus brutia** belt growing in the places where Mediterranean climatic is dominant and rising up to 1000-1200 m. and in some areas this belt forms the mixed forests composed of **Pinus brutia** and **Quercus** sp.

2— Sparsely wooded and tell grasses areas which are widespread between 1000 and 1400 m.

3— Rear oro-Mediterranean belt extending between 1400 and 2000 m, and composed of **Cedrus libani, Pinus nigra** var. **pallasiana** and **Abies cilicica** and juniper species.

Inner Anatolia can be divided into two main belts from the vegetation point of view: 1— Steppe area which is under the influence of continental climate and which rises up to 1000, 1200 m and then the oro and/or Upper-Mountainous belt mainly composed of **Pinus nigra** var. **pallasiana, Quercus cerris** and **Q. pubescens** and some juniper species; this belt, rises up to 2400 m. (Fig. 4).

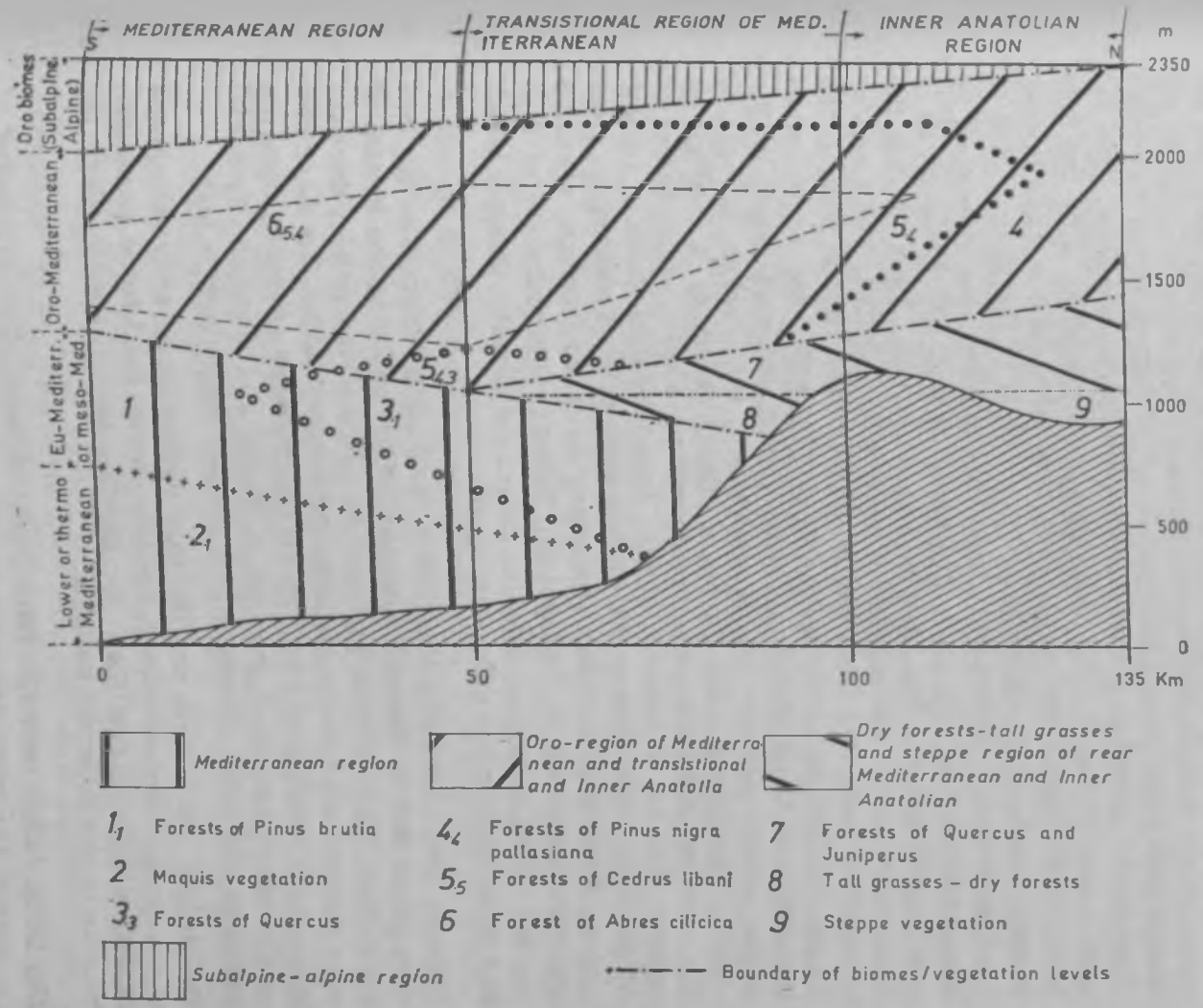

Figure 4: Vegetation levels representing the Taurus mountains or Mediterranean region of Turkey.

4— The vegetation of the Mediterranean region is not stabilized because of the fact that climatic changes had occured during the Quaternary time. During the glacial period Euro-Siberian elementes must have spread over the Taurus Mountains and that time the higher part of the Taurus Mountains were glaciated; And the lake levels of the region had raised, thus some lakes such as Lake Burdur basin opened outer drainage system. While in the drier period of the Quaternary, the present levels of the lakes were lowered; on the one hand, the elements of Irano-Turanian and Arabian have penetrated towards the Mediterranean Region. Thus during the Quaternary time, the vegetation belts were shifted away and/or changed considerably from one places to other. That is why, in the Taurus Mountains, some trees and herbs and their communities belonging to Euro-Siberian floristic region are also found in the places where wet and humid habitats of the Taurus mountains stands. For example, the forests of **Fagus orientalis** appearing on the Amanos mountains are considered as a relic communities or forests, and are an enclave of the Euro-Siberrian floristic region. At the same time **Tilia rubra, Sorbus torminalis, Fraxinus** sp., **Acer** species, **Euonymus latifolius** belonging to Euro-Siberian elements are come across on the Dedegöl and Davraz Mountains (W of Taurus M.). These plant communities reflect the climatic changes which had been taken place during the past.

Endemic species are also observed in the Taurus Mountains. The best example of this is **Quercus vulcanica** which grows in the bottom of the dolines. These dolines provide wet habitats and protect the oaks from the cold wind blowing during the winter months. The other best known both endemic and relic tree is **Liquidambar orientalis** occuring on the alluvial plain of the Lake Köyceğiz and along the Eşen and Dalaman and Aksu streams where ground water level is high.

The deeply cut valleys and the very rugged topography strenghten of the isolationary conditions, For this reason, the Taurus mountains provide a suitable condition for growing several species which belonging to the different habitats.

The biotic factor seems to have been changed the distributing of the plants. The most striking example is come into scene on the subalpine meadow of Taurus mountains. Here, most of the climax Mediterranean herbaceous species were replaced by the Irano-Turanian herbaceous species whose tolerating limit is wide due to overgrazing.

5— Vegetation distribution of the region is sometimes affected by which termed pedobioms. For example on the saline soils occuring

terranean Sea, while the tree commences at an elevation of 1400 to the certain soil, parent material and geomorphic peculiarities along the Mediterranean coast **Cressa cretica, Zygophyllum album, Arthrocnemum glaucum, Halocnemum strobilaceum, Salicornia europea** and **Halimione portulacoides** are found out. The plant associations indentified on the littoral dunes are **Euphorbia parlias, Galilea mucronata, Pancratium maritimum, Onosis hispanica, Sporobolus pungens** and **Alhagi munnifera** (Uslu 1977). Ultrabasic complex subjected to severe erosion is covered by sparsely herbaceous vegetation and some part of this parent material is bare due to strong alkaline reaction.

Shortly, the vegetational levels of the Taurus mountain ranges show different belt from the south to the north, and both in the vertical and horizontal direction depending on altitute and continentality. The identified main region are 1- Mediterranean, 2- transistonal region of the Mediterranean and Inner Anatolia or backward region of Mediterranean and 3- Inner Anatolian region, and there are a few vertical belts in the each region (Fig. 4).

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Ö Z E T

AKDENİZ BÖLGESİNDEKİ TOROS DAĞLARININ VEJETASYON KUŞAKLARI

Aşağı yukarı Akdeniz Bölgesi'ni kapsayan batıda Teke yarımadasından başlayarak doğuda Gaziantep yakınına kadar uzanan Toros dağları boyunca bulunan vejetasyon yükseklik basamaklarına göre aşağıdaki kuşaklara ayrılmıştır.

1. AKDENİZ BÖLGESİ

1.1. *Alt veya sıcak Akdeniz kuşağı :* Bu kuşak, Toros dağlarının Akdeniz'e bakan yamaçları boyunca ortalama 1000, en fazla 1500 m ye kadar çıkmakta olup, bu kuşakta kızılçam *(Pinus brutia)* ormanları hakimdir. Bu kuşağın 500-800 m ye kadar yükselen alt kısmında ise kızılçam ormanlarının tahribi sonucu gelişmiş olan çalı (maki) vejetasyonu yer yer baskın durumdadır.

1.2. *Akdeniz üst kuşağı (Oro-Mediterranean kuşak) :* Bu kuşakta sedir *(Cedrus libani)*, karaçam *(Pinus nigra* var. *pallasiana)*, göknar *(Abies cilicica)* saf ve karışık ormanları yer almaktadır.

2. AKDENİZ ARDI veya AKDENİZ GEÇİŞ BÖLGESİ

Akdeniz ve İç Anadolu karasal ikliminin geçişine tekabül eden ve batıda Göller bölgesi, Orta Toroslarda Göksu havzası orta ve yukarı bölümü, doğuda Maraş-Antakya grabenini kapsayan bu bölgede üç ayrı vejetasyon kuşağı mevcuttur.

2.1. *Alt kuşak :* Kızılçam, kısmen de maki elementlerinin karışımından oluşan bu kuşakta yer yer meşe toplulukları da görülmektedir.

2.2. *Orta kuşak :* 800-1400 m arasında uzanan tektonik kökenli havza ve çevresini kapsayan bu kuşak, yer yer meşe, meşe+ardıç ve depresyonların tabanlarında kuru orman-uzunboylu step karışımından ibarettir.

2.3. *Üst kuşak:* 1200-2200 m arasında uzanan bu kuşakta saf sedir, karaçam ve kuzeye bakan yamaçlarda göknar ormanları yer almaktadır.

3 İÇ ANADOLU BÖLGESİ

Denizel etkilere kapalı olan ve daha ziyade İç Anadolunun güneyinde uzanan bu bölgede iki ayrı vejetasyon kuşağı görülmektedir.

3.1. *Step kuşağı :* İç Anadolu'da yer yer 1200 m ye kadar yükselen bu kuşakta doğal stepler baskın durumdadır.

3.2. *İç Anadolu dağ veya üst kuşağı:* 2400 m ye kadar çıkan bu kuşakta karaçam, ardıç ve meşe ormanları, kuzeye bakan yamaçlarda ise nadiren sedir ve göknar toplulukları görülmektedir.

Bu kuşakların dışında Akdeniz üst kuşağında 2000 m de, iç kısımlara doğru 2200-2400 m den sonra başlayan ve İç Anadolu dikenli, yastık şekilli otların yaygın olduğu subalpin ve daha yükseklerde alpin kuşak uzanmaktadır.

Yukarıda belirtilen bu kuşaklar dahilinde özellikle Amanos dağlarından kayın *(Fagus orientalis)*, gürgen *(Carpinus orientalis)* ormanları, Batı Toroslarda Dedegöl dağlarında ıhlamur *(Tilia rubra)*, kasnak meşesi *(Quercus vulcanica)*, dişbudak *(Fraxinus oxycarpa)*, akçaağaç *(Acer platanoides)* vs gibi yayvan yapraklı saf ve diğer ibreli türlerle karışık topluluklar bulunmaktadır. Ormanaltı ot ve çalıların floristik kompozisyonları dikkate alındığında son derece artzalı olan ve kuvvetli izolasyon şartları yaratan Toros sisteminde farklı flora veya fitocoğrafya bölgelerine ait tür ve topluluklar bulunmaktadır. Örnek olarak, Amanos, Dedegöl ve Davras dağında Avrupa-Sibirya florasına ait anklavlar yer almaktadır. Ayrıca, endemikler yönünden de oldukça zengindir. Bunlar Kuvaterner'de meydana gelen iklim değişmelerinin bir eseri olarak dikkate alınmalıdır.

Bölgede bakı ve yükseklik şartlarının kısa mesafeler dahilinde sık sık değişmesi, bitki kuşaklarında yer yer önemli ölçüde seviye değişmelerine ve farklı toplulukların da araya girmesine neden olmaktadır.